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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,052	08/17/2006	Peter Gunter	FRR-16734	5299

40854 7590 07/22/2009

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EXAMINER	
MUSTAPHA, ABDULFATTAH B	
ART UNIT	PAPER NUMBER
2812	

MAIL DATE	DELIVERY MODE
07/22/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/597,052	GUNTER ET AL.	
	Examiner	Art Unit	
	ABDULFATTAH MUSTAPHA	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 March 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) *1-10,12,14 and 20-27* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11,13,15-19 and 28-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/10/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group II in the reply filed on 03/20/2009 is acknowledged.

Claim Objections

Claim 16 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 16 is said to depend from a canceled claim 12. The examiner exam claim 16 as depend from claim 11.

Claim Rejections - 35 USC § 102

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 11, 28 and 39 are rejected under 35 U.S.C. 102(e) as being anticipated by Strecker [US 6,661,950].

Strecker disclose two waveguide branches 10, 20, the first branch 10 being coupled to a first micro- resonator 12, and the second branch 20 being coupled to the

same micro-resonator 12 or to a second micro-resonator different from the first micro-resonator [Figures 1 and 3], wherein cores of the waveguide branches and the micro-resonators comprise a ferroelectric material on a first substrate wherein said ferroelectric crystal material has been transferred as a from a ferroelectric crystal by a method comprising the steps of providing said ferroelectric crystal, of irradiating a first surface of said ferroelectric crystal with ions so that a damaged layer is created underneath said first surface, of bonding a block of material including said first substrate to said ferroelectric crystal to create a bonded element [Col. 5; Line 18 – 53, Figure 7], wherein an interface is formed between said first surface and a second surface of said block, and of heating the bonded element and separating it at the damaged layer, so that a ferroelectric crystal layer remains supported by the first substrate, and according wherein at least one branch and/or a micro-resonator coupled to it comprises an electrode for influencing the index of refraction of the ferroelectric material, the electrode being formed in a layer parallel to the ferroelectric crystal layer and being positioned between the first substrate and the ferroelectric crystal layer [Col. 6; Line 30 – 52, Figure 9] (Claims 11 and 39). Strecker disclose electrode is arranged between said first substrate and a dielectric layer on which the ferroelectric crystal layer is arranged {Col. 6; Line 44 – 50} (Claim 13). Strecker disclose the step of, prior to bonding the block to the ferroelectric crystal, fabricating said block by providing the first substrate 52, and applying a layer of electrically conducting material 84 to it to form said electrode {Figure 7] (Claim 28)..

Claims 11 and 39 are rejected under 35 U.S.C. 102(e) as being anticipated by Li et al. [US 2003/0223695]

Li et al. disclose two waveguide branches 150, 155, the first branch 150 being coupled to a first micro- resonator 110, and the second branch 155 being coupled to the same micro-resonator or to a second micro-resonator different from the first micro-resonator [0026, Figure 1], wherein cores of the waveguide branches and the micro-resonators comprise a ferroelectric material on a first substrate [0010, 0011] wherein said ferroelectric crystal material has been transferred as a from a ferroelectric crystal by a method comprising the steps of providing said ferroelectric crystal, of irradiating a first surface of said ferroelectric crystal with ions so that a damaged layer is created underneath said first surface, of bonding a block of material including said first substrate to said ferroelectric crystal to create a bonded element, wherein an interface is formed between said first surface and a second surface of said block []0030 – 0040, and of heating the bonded element and separating it at the damaged layer, so that a ferroelectric crystal layer remains supported by the first substrate [0011], and according wherein at least one branch and/or a micro-resonator coupled to it comprises an electrode for influencing the index of refraction of the ferroelectric material, the electrode being formed in a layer parallel to the ferroelectric crystal layer and being positioned between the first substrate and the ferroelectric crystal layer {0026, 0027, 0030 – 0040, 0073 – 0075} (Claims 11 and 39).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Strecker [US 6,661,950] as applied to claim 11 above, and further in view of Yoshimura et al. [2002/0039464].

Yoshimura et al. disclose Mach-Zehnder modulator [0114] (claim 15).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the invention of Strecker by adding Mach-Zehnder modulator as taught by Yoshimura et al. in order to enhance total internal reflection.

Claim 16 – 19, 32, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strecker [US 6,661,950] as applied to claims 11 above, and further in view of Braun et al. [US 2002/0039470].

Strecker disclose a plurality of micro-resonator pairs or groups of micro-resonator pairs, each micro-resonator pair comprising a micro-resonator coupled to one waveguide branch and one micro- resonator coupled to the other waveguide branch,

each micro-resonator pair or group of micro-resonator pairs comprising an electrode for influencing the index of refraction of the ferroelectric material, the different electrodes being separated from each other [Col. 5; Line 18 – 53, Figure 7] (Claim 17).

Braun et al. disclose a wavelength selective switch {0012, 0016} (Claims 16 and 37). Braun et al. disclose dynamic wavelength router for routing optical signals of different wavelengths connected to each other network-like {0004, 0076} (claim 18). Braun et al. disclose a switchable out-coupler {0016} (Claim 19). Braun et al. disclose material at the second surface has an index of refraction that is lower than the index of refraction of said ferroelectric crystal by at least 10% [0057] (Claim 32). Braun et al. disclose a wavelength selective switch {0065, 0111} (claim 38).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the invention of Strecker by adding a wavelength selective switch as taught by Braun et al. in order to enhance the information provided to the integrated optical component.

Claims 28 – 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strecker [US 6,661,950] as applied to claim 11 above, and further in view of Kub et al. [US 6,593,212].

Kub et al. disclose the step of, prior to bonding the block to the ferroelectric crystal, fabricating said block by providing the first substrate, and applying a layer of electrically conducting material to it to form said electrode {Col. 3; Line 10 - 25} (Claim 28). Kub et al. disclose the step of applying a dielectric layer to said layer of electrically conducting material, said dielectric layer forming said second surface {Col. 3; Line 10 - 25} (Claim 29). Kub et al. disclose ferroelectric crystal is a $LiNbO_3$ or $LiTaO_3$ or $KNbO_3$ crystal {Col. 5; Line 16 - 22} (Claim 30). Kub et al. disclose a second ferroelectric crystal, said second ferroelectric crystal preferably being a $LiNbO_3$ or $LiTaO_3$ or $KNbO_3$ crystal {Col. 11; Line 16 – 20, Col. 11; Line 41 – 51} (Claim 31). Kub et al. disclose material at the second surface has an index of refraction that is lower than the index of refraction of said ferroelectric crystal by at least 10% {Col. 5; Line 45 – 54} (Claim 32). Kub et al. disclose material is a silicon oxide {Col. 5; Line 45 – 54} (Claim 33). Kub et al. disclose the step of chemical mechanical polishing of the first substrate prior to the bonding {Col. 8; Line 44 – 53, Figure 5a} (claim 34).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the invention of Strecker by adding a ferroelectric crystal, said ferroelectric crystal preferably being a $LiNbO_3$ or $LiTaO_3$ or $KNbO_3$ crystal as taught by Kub et al. in order to enhance optical amplifiers and waveguide lasers.

Claims 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strecker [US 6,661,950] as applied to claim 11 above, and further in view of Levy et al. [US 6,540,827].

Levy et al. disclose the step of annealing and/or polishing the ferroelectric crystal layer after the separating step {Col. 3; Line 56 – 65} (Claim 35). Levy et al. disclose the ferroelectric crystal is a bulk ferroelectric crystal {Col. 3; Line 56 – 65} (Claim 36).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the invention of Strecker by adding the step of annealing and/or polishing the ferroelectric crystal layer after the separating step as taught by Levy et al. in order to enhance detachment crystal structure

Claims 40 – 43 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strecker [US 6,661,950] as applied to claim 39 above, and further in view of Khodja [US 5,943,464].

Strecker disclose fabricated using by a method of transferring ferroelectric material from a ferroelectric crystal by a process comprising the steps of providing said ferroelectric crystal, of irradiating a first surface of said ferroelectric crystal with ions so that a damaged layer is created underneath said first surface, of bonding a block of material including said first substrate to said ferroelectric crystal to create a bonded

element, wherein an interface is formed between said first surface and a second surface of said block, and of heating the bonded element and separating it at the damaged layer, so that a ferroelectric crystal layer remains supported by the first substrate {Col. 6; Line 30 – 52, Figure 9} (Claim 40).

Khodja disclose a parametric amplifier 40 or frequency doubling device [Figure 3], the parametric amplifier 40 or frequency doubling device comprising a waveguide 25, 45 formed by a layered structure and a cladding [Figures 3 and 4], wherein the layered structure comprises at least two layers of a ferroelectric material arranged adjacent to each other in a layer sequence [Col. 1; Line 48 – 58}, wherein the spontaneous polarization of neighboring layers of the layer sequence differs {Col. 6; Line 16 – 62, Figures 1 - 4} (Claim 40). Khodja disclose [Figures 2, 7 and 8] (Claim 41)Khodja disclose the spontaneous polarization of neighboring layers in the layer sequence is opposed [Col. 1; Line 43 – 47] (Claim 42). Khodja disclose the thickness of one layer of the layered structure is correlated to the waveguide configuration in a manner that a higher than fundamental mode has a node close to an interface between two adjacent layers {Col. 7; Line 27} (Claim 43). Khodja disclose a waveguide formed by a layered structure and a cladding and further comprising electrodes with a periodic pattern, so the core waveguide may be poled periodically to achieve quasi phase matching for frequency doubling or parametric amplification { Abstract, Col. 2; Line 62 – Col. 3; Line 7} (Claim 45).

It would have been obvious to one of ordinary skill in the art at the time of

invention to modify the invention of Strecker by adding the paramateric amplifier or frequency doubling device comprising a waveguide formed by a layered structure and a cladding, wherein the layered structure comprises at least two layers of a ferroelectric material arranged adjacent to each other in a layer sequence, wherein the spontaneous polarization of neighboring layers of the layer sequence differs as taught by Khodja in order to enhance phase matching between fundamental and second harmonic waves.

Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Strecker [US 6,661,950] in view of Khodja [US 5,943,464] as applied to claim 39 above, and further in view of Schemmann et al. [US 2006/0228118].

Schemmann et al. disclose the dimensions of the waveguide are chosen such that the waveguide contribution to the chromatic dispersion and the chromatic dispersion contributed by the ferroelectric material compensate each other in a certain wavelength range {0015} (Claim 44).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the invention of Strecker by adding the dimensions of the waveguide are chosen such that the waveguide contribution to the chromatic dispersion and the chromatic dispersion contributed by the ferroelectric material compensate each other in a certain wavelength range as taught by Schemmann et al. in order to enhance receiver performance.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ABDULFATTAH MUSTAPHA whose telephone number is (571)272-9736. The examiner can normally be reached on Mon-Thus. (10:00am - 8:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Garber can be reached on 571-272-2194. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Abdulfattah Mustapha

/Alexander G. Ghyka/
Primary Examiner, Art Unit 2812